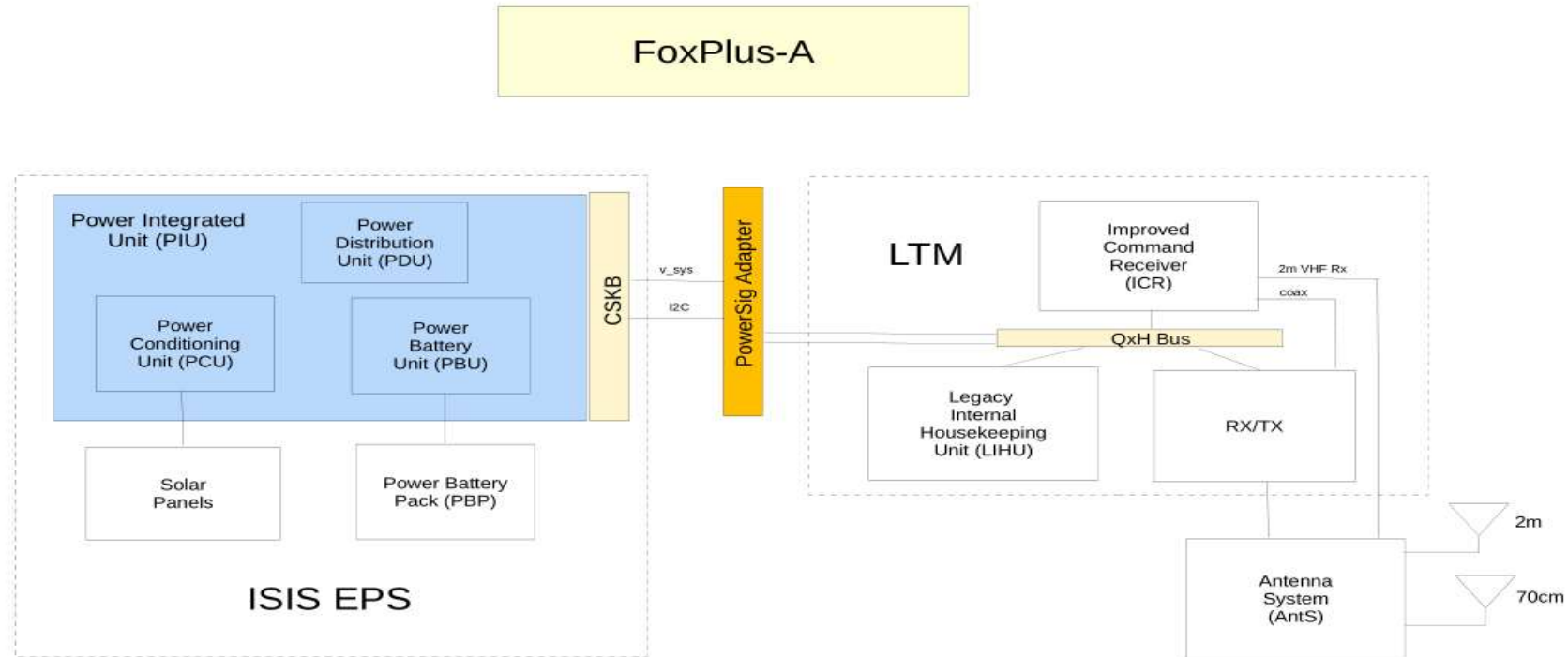




## **FoxPlus-A Update and The Future of FoxPlus**

**October 18, 2025**

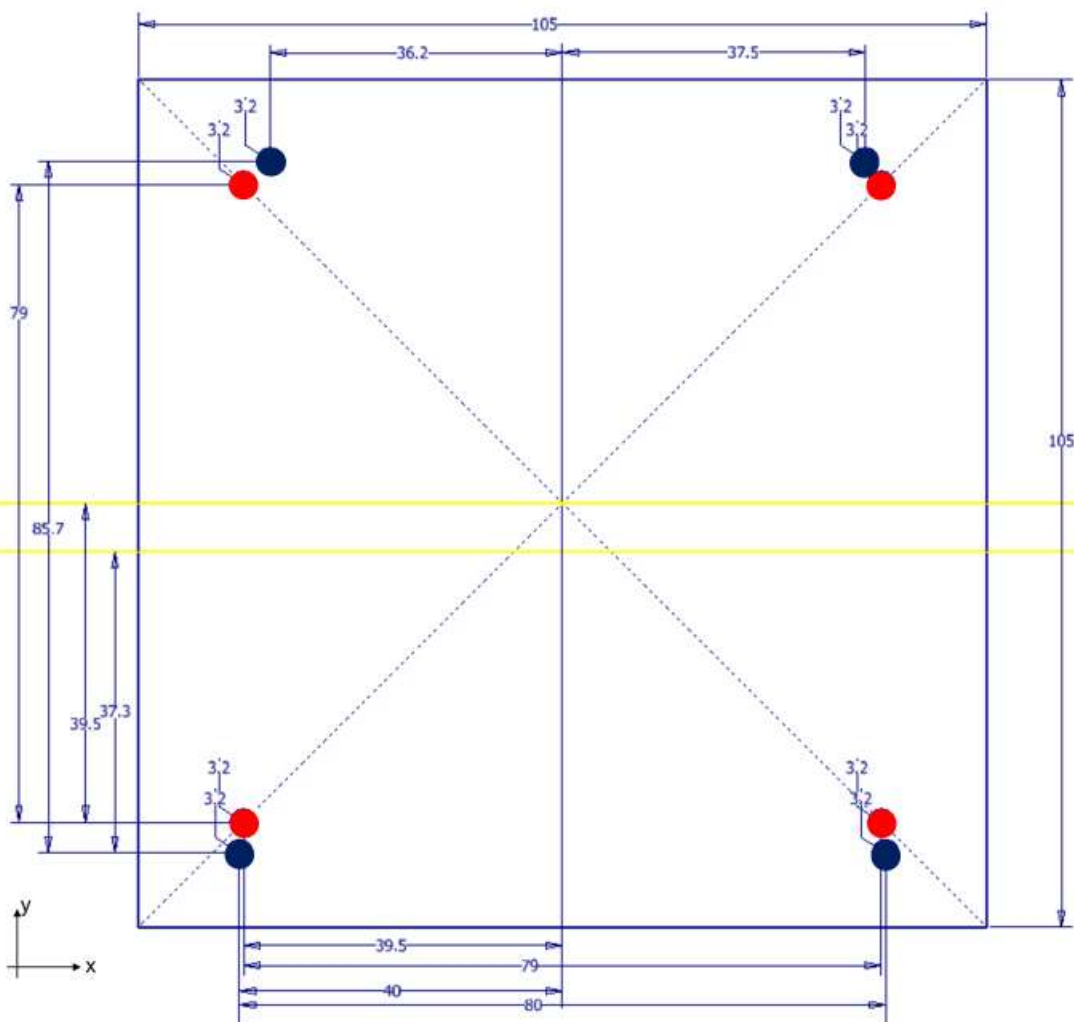
## FoxPlus-A Update



Fox-Plus-A Subsystems  
Functional Block Diagram  
Rev D

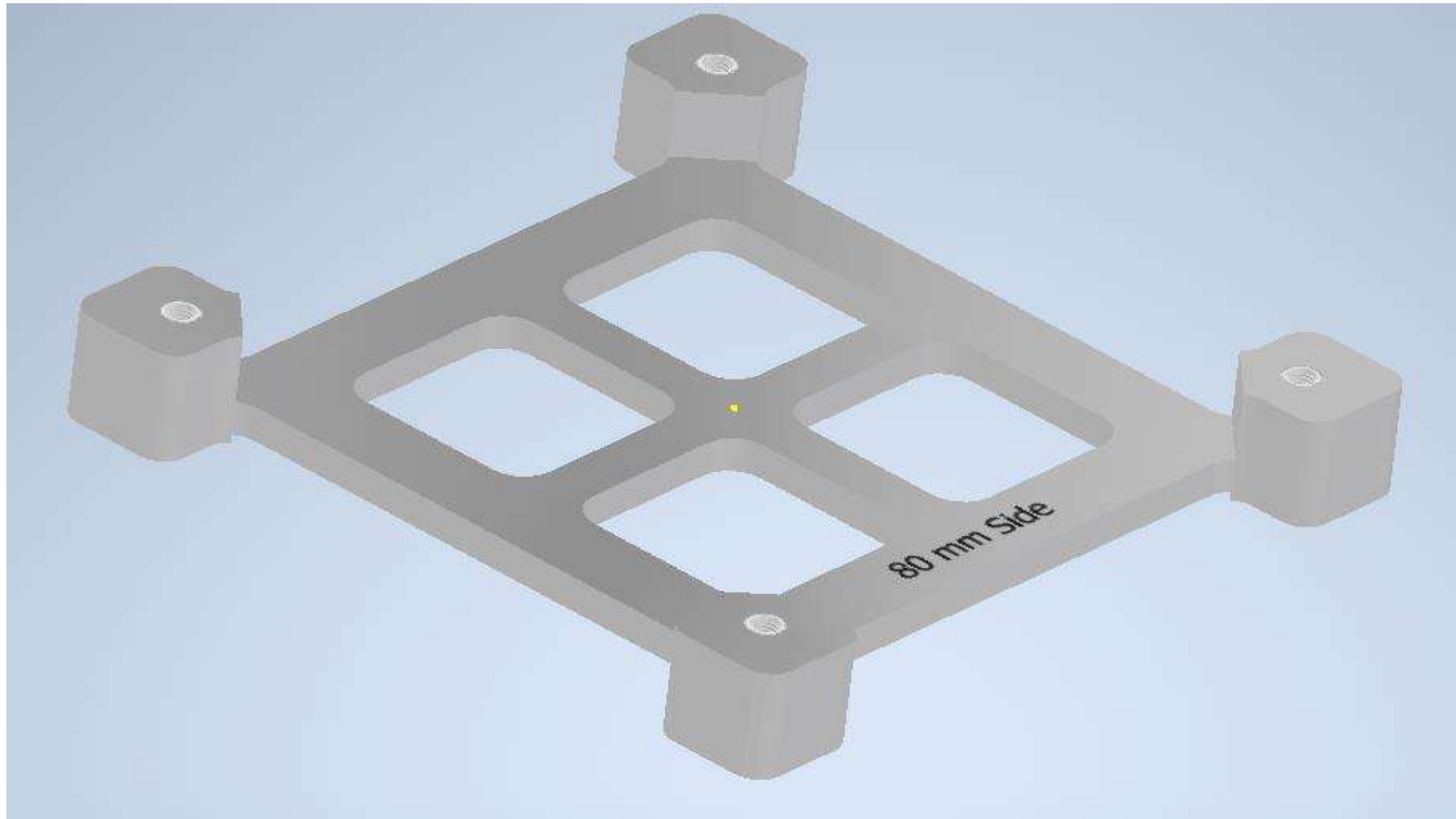
## FoxPlus-A Update

ISISpace mounting holes do not line up with AMSAT ME-113 board mounting holes. A structural adapter was necessitated. A 3D printed plastic adapter was prototyped and found good, so a metal adapter has been manufactured for the Engineering Model (EM)



- Non-symmetric ISISpace hole patterns (frame, PBP, and PIU) present an integration challenge with PCB's build to FOX-ME-113
- 1U volume constraints restrict options to move pattern in the XY-plane
- Adapter design challenged by close proximity of holes; thru-holes or keenserts needed to facilitate TBD mounting schema
- PCB stack-up considerations needed to maximize available space

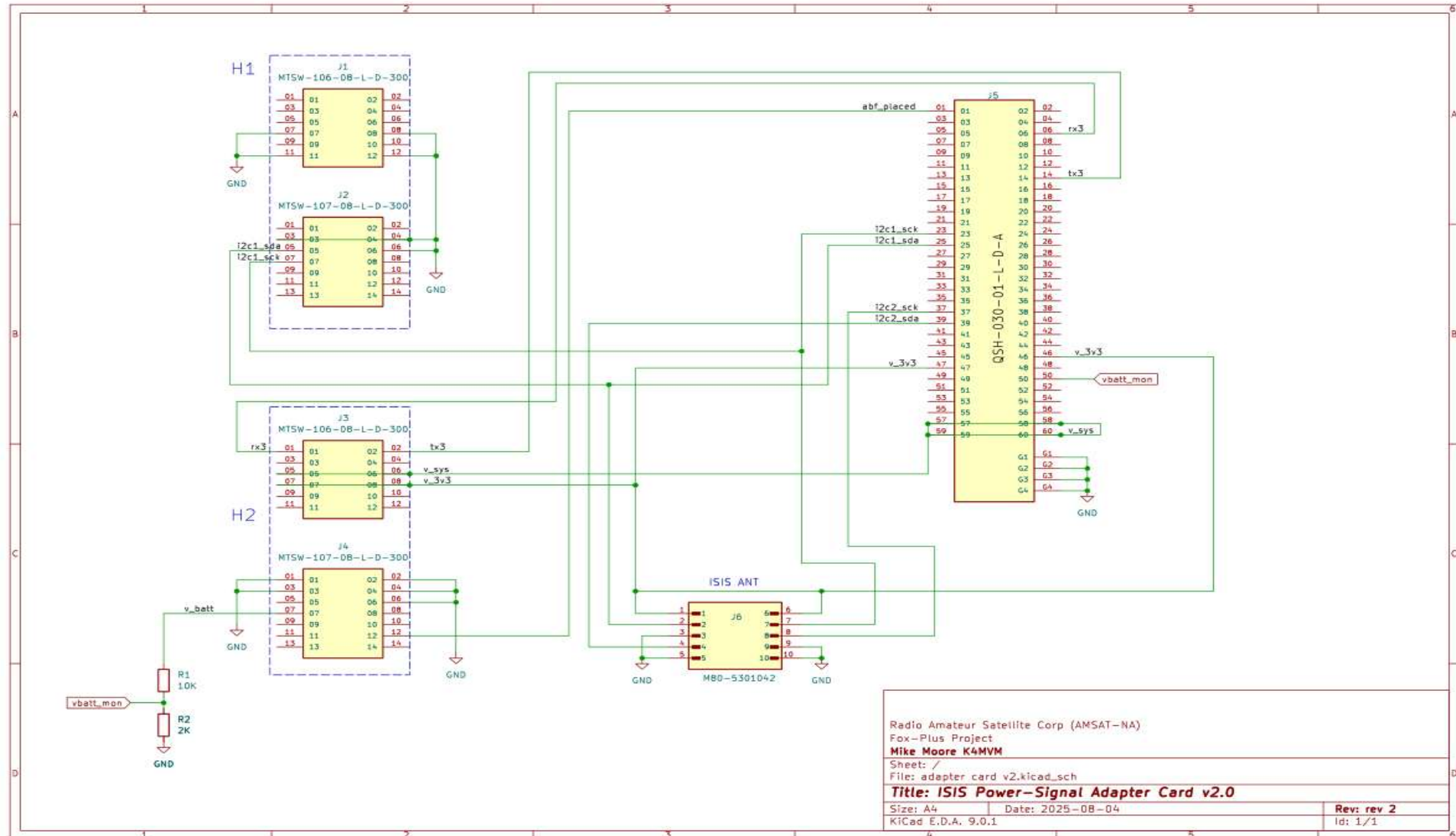
## Structural Adapter



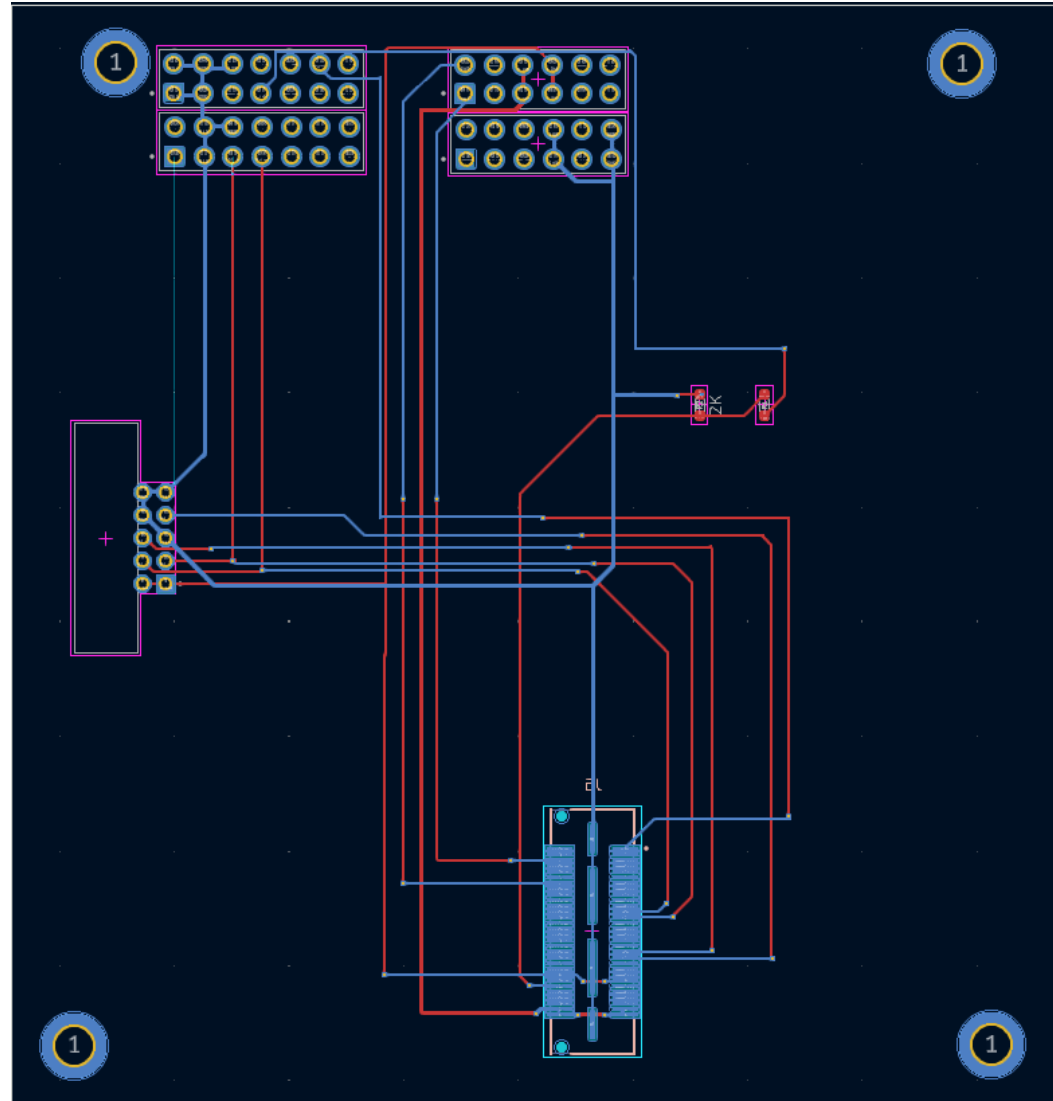
## Power Signal Adapter (PSA)

The ISISpace Electrical Power System (EPS) power and I2C signals had to be connected to the AMSAT stacking connector. The PSA board was prototyped and is working. A 2 layer version has proved fit and function. A 4 layer version is being built for EM.









## Structural / Mechanical

1. Cabling / wiring routing within the cubesat
  2. CubeSat physical structure
  3. Mechanical Adapter for ISIS frame to AMSAT board dimensions has been prototyped
- PSA connectors pins too long. Mike got shorter pin connectors as samples, mounted them and shipped them to Andrew. They worked.
  - Andrew has been working on cabling in Inventor
    - And has new hardware?



## FoxPlus Flight Software

Burns is working on FoxPlus Telemetry and Flight software  
Very good progress. 80% complete?





# FoxPlus Engineering



AMSAT Telemetry Analysis Tool

File Decoder Spacecraft Help

Input

FoxPlus-A

Golf-T

HealthPartnerPartner WOD**WOD**DiagnosticsPartner ScienceMeasurements

Satellite FoxPlus-A(EM) Mode: HEALTH

Latest Realtime: Epoch: 20 Uptime: 581

Max: Epoch: 20 Uptime: 581

Min: Epoch: 20 Uptime: 556

Telemetry Payloads Decoded: 43

LTM Status

|                     | RT       | MIN  | MAX  |
|---------------------|----------|------|------|
| IHU Temp (C)        | 37.0     | 31.0 | 39.0 |
| Bus Voltage (V)     | 5.1      | 5.0  | 5.2  |
| Auto Safe Allowed   | TRUE     |      |      |
| Auto Safe           | FALSE    |      |      |
| Antenna Status      | 11111111 |      |      |
| Antenna Stat Valid  | FAIL     |      |      |
| WOD Stored          | 148      |      |      |
| MRAM Status         | 2        |      |      |
| In Eclipse          | FALSE    |      |      |
| Min/Max Reset Count | 0        |      |      |

LTM Transmitter

|                      | RT       | MIN  | MAX    |
|----------------------|----------|------|--------|
| PA Current (mA)      | 171.8    | 34.3 | 292.0  |
| TX Temperature (C)   | 37.5     | 20.0 | 39.5   |
| Fwd Power (mW)       | 100.0    | 88.3 | 1198.7 |
| Refl Power (mW)      | 0.1      | 0.1  | 0.3    |
| VGA Control (V)      | 0.1      | 0.1  | 2.4    |
| Transponder Enabl... | Disabled |      |        |
| Modulator Temp (C)   | 40.0     | 40.0 | 40.0   |
| Modulator Valid      | TRUE     |      |        |
| Modulator Reg 0      | 125      |      |        |
| Modulator Reg 1      | 219      |      |        |
| Modulator Reg 5      | 16       |      |        |
| Modulator Reg 8      | 4        |      |        |

LTM Cmd Receiver

|                   | RT         | MIN    | MAX    |
|-------------------|------------|--------|--------|
| ICR RSSI (dBm)    | -108.5     | -146.0 | -100.4 |
| ICR Receiver On   | 1          |        |        |
| 3.3V Prot (V)     | 3.3        | 3.3    | 3.3    |
| ICR Temp (C)      | 27.5       | 20.5   | 30.0   |
| I2cICR            | OK         |        |        |
| Diagnostic        | ---        |        |        |
| HW Cmd Cnt ICR    | 0          |        |        |
| SW Cmd Cnt ICR    | rtc:0 sw:0 |        |        |
| ICR Carrier Valid | 0          |        |        |

LTM Gyro

|                     | RT   | MIN  | MAX  |
|---------------------|------|------|------|
| X Rotation (dps)    | 0.0  | 0.0  | 0.0  |
| Y Rotation (dps)    | 0.0  | 0.0  | 0.0  |
| Z Rotation (dps)    | 0.0  | 0.0  | 0.0  |
| X Acceleration (g)  | 0.0  | -0.0 | 0.0  |
| Y Acceleration (g)  | 0.0  | 0.0  | 0.0  |
| Z Acceleration (g)  | 1.0  | 1.0  | 1.0  |
| X Magnetometer (uT) | 0.0  | 0.0  | 0.0  |
| Y Magnetometer (uT) | 0.0  | 0.0  | 0.0  |
| Z Magnetometer (uT) | -0.6 | -0.6 | 0.0  |
| Gyro Temp (C)       | 29.5 | 25.0 | 31.5 |

Min Max Info

|                     | RT       | MIN | MAX |
|---------------------|----------|-----|-----|
| Max Last Change     | 20 / 61  |     |     |
| Min Last Change     | 18 / 337 |     |     |
| MinMax Reset Time   | 0 / 0    |     |     |
| Max CRC Error Co... | 0        |     |     |
| Min CRC Error Count | 0        |     |     |

ISISpace Power Distro

|                   | RT    | MIN     | MAX   |
|-------------------|-------|---------|-------|
| EPS Mode          | 0     |         |       |
| Rail Volts (V)    | 0.0   | 0.0     | 26.0  |
| Rail Current (mA) | 0.0   | 26.0    | 0.0   |
| 5V Volts (V)      | 0.0   | 0.1     | 12.9  |
| 5V Current (mA)   | 0     | 255     | 23    |
| 3V3 Volts (V)     | -20.0 | Invalid | -20.0 |
| 3V3 Current (mA)  | -20.0 | Invalid | -20.0 |
| Channel Bitmap    | FAIL  |         |       |

ISISpace Battery Pack

|                       | RT    | MIN  | MAX     |
|-----------------------|-------|------|---------|
| Chip Temp (C)         | -50   | -50  | Invalid |
| Center Temp (C)       | -50   | -50  | Invalid |
| Front Temp (C)        | -50   | -50  | Invalid |
| Battery 1 Volts (V)   | -50   | 116  | 118     |
| Battery 2 Volts (V)   | -50   | 55   | 198     |
| Battery 3 Volts (V)   | 0.0   | 0.3  | 0.0     |
| Battery 4 Volts (V)   | 0.0   | 0.0  | 0.0     |
| Battery Pack Statu... | -50   | 0000 | 0000    |
| Batt Pack Volts (V)   | 0     | 165  | 7       |
| Battery Current (mA)  | -2000 | 588  | -1561   |
| Battery Heater        | OFF   |      |         |

ISISpace Conditioning

|                     | RT    | MIN     | MAX   |
|---------------------|-------|---------|-------|
| MPPT1 Out Volts (V) | 0     | 160     | 255   |
| MPPT1 Out Cur (mA)  | 0     | 57      | 255   |
| MPPT1 Out Pwr (m... | 0     | 32      | 8     |
| MPPT2 Out Volts (V) | 0     | 169     | 164   |
| MPPT2 Out Cur (mA)  | 0     | 100     | 57    |
| MPPT2 Out Pwr (m... | -20.0 | Invalid | -20.0 |
| MPPT3 Out Volts (V) | -50   | 193     | 122   |
| MPPT3 Out Cur (mA)  | 0     | 57      | 89    |
| MPPT3 Out Pwr (m... | 0     | 93      | 255   |

ISISpace Solar Panels

|                    | RT    | MIN   | MAX  |
|--------------------|-------|-------|------|
| MPPT1 In Volts (V) | 0.0   | 16.8  | 0.2  |
| MPPT1 In Cur (mA)  | 0.0   | 16.8  | 0.8  |
| MPPT1 In Pwr (mW)  | 0     | 0     | 1    |
| MPPT2 In Volts (V) | 0     | 0     | 255  |
| MPPT2 In Cur (mA)  | 0     | 32    | 255  |
| MPPT2 In Pwr (mW)  | 0     | 255   | 5    |
| MPPT3 In Volts (V) | 0     | 1     | 0    |
| MPPT3 In Cur (mA)  | -20.0 | -16.0 | -4.0 |
| MPPT3 In Pwr (mW)  | -50   | -50   | 274  |
| +X Panel Temp (C)  | 64.5  | 42.5  | 65.0 |
| -X Panel Temp (C)  | 67.5  | 43.0  | 68.0 |
| +Y Panel Temp (C)  | 71.0  | 32.5  | 71.5 |
| -Y Panel Temp (C)  | 75.0  | 52.5  | 75.5 |
| -Z Panel Temp (C)  | -5.0  | -17.0 | 8.5  |

☒ Current

☐ RT

☐ MAX

☐ MIN

☐ Display Raw Values

☐ Display UTC Time

Last

180

samples

Captured: 2025/09/20 11:05:42

Version 1.13j - 19 Jul 2025

Logs: C:\Users\burns\FoxTelemData

SDR Errors: 0 / 0

Audio missed: 0.0% / 0

Frames: 0

Payloads: 55

Queue: 0

## FoxPlus-A Summary

**FoxPlus-A is ready for Preliminary Design Review (PDR)  
And Engineering Model build**



## FoxPlus-A Schedule (Tentative)

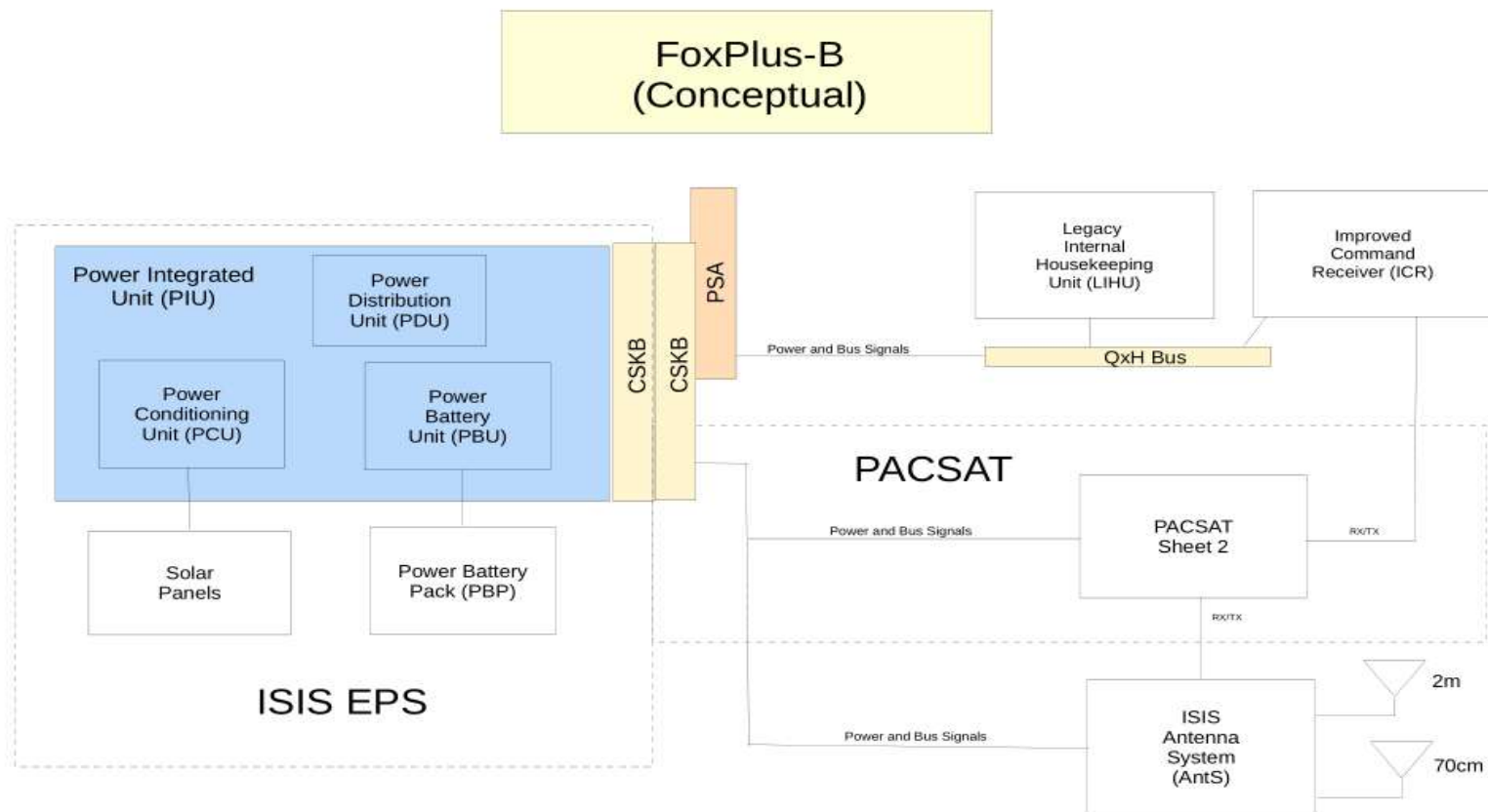
|                 |                |
|-----------------|----------------|
| PDR             | Nov / Dec 2025 |
| EM System Test  | Jan 2026       |
| CDR             | Feb 2026       |
| FM Build & Test | Mar – Jun 2026 |
| Final Testing   | Jul – Sep 2026 |
| Launch!         | Dec 2026       |

## The Future for FoxPlus

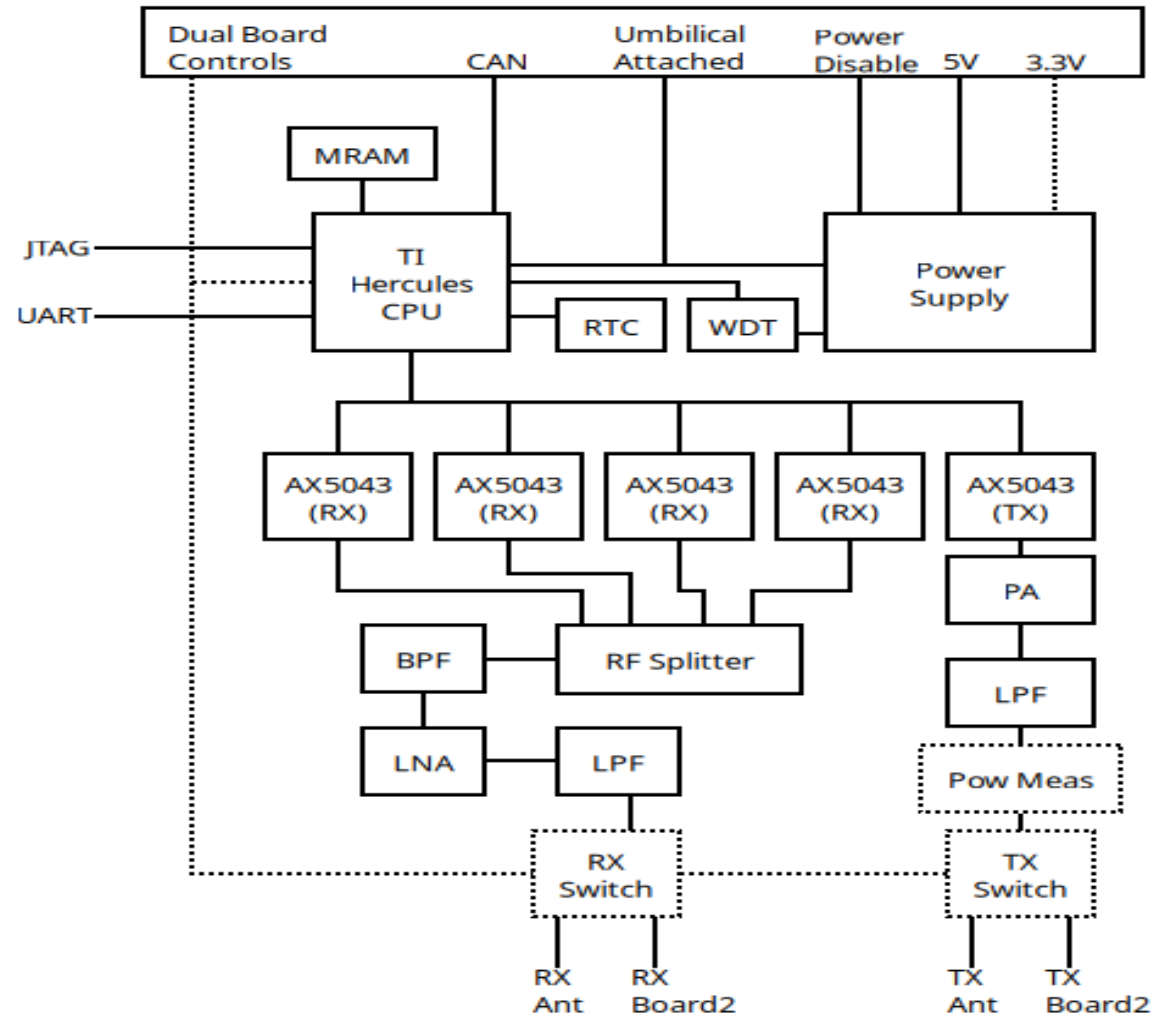
## FoxPlus-B

**FoxPlus-B will be the second and likely the last AMSAT satellite built on the ISIS platform. It will utilize the PacSat board and be a digital satellite with Bulletin Board Service (BBS) capabilities!**

**Information available at <link>**



## PACSAT



## FoxPlus-B Schedule (Tentative)

|                 |                |
|-----------------|----------------|
| Start           | Mar 2026       |
| PDR             | Jun 2026       |
| EM System Test  | Jun / Jul 2026 |
| CDR             | Jul 2026       |
| FM Build & Test | Jul – Sep 2026 |
| Final Testing   | Oct - Dec 2026 |
| Launch!         | Mar 2027       |

## FoxPlus-C and Beyond

**With the demise of the NASA CSLI program, it becomes important to plan for paid launches for our cubesats.**

**GOLF, being a 3U cubesat will cost approx. \$300K / launch. FoxPlus may be used as a less expensive platform on which to test various technologies.**



## FoxPlus-C and Beyond

The FoxPlus-C will have an “in-house” frame, EPS, and solar panels. i.e., we will “roll our own”. The frame design will be based on the work done on the original Fox series of cubesats. The EPS and solar panels will be based on work done on GOLF.

## FoxPlus-C Schedule (WAG)

|                |                |
|----------------|----------------|
| Start          | Sep 2026       |
| PDR            | Apr 2027       |
| EM System Test | Apr - Jun 2027 |
| CDR            | Jul 2027       |
| Final Testing  | Aug – Oct 2027 |
| Launch!        | Dec 2027       |

## FoxPlus-C and Beyond

We may go to a 2U frame for FoxPlus-C. 2U would be capable of more power (more solar cells) and more payloads per satellite.

We would need to be able to turn the payloads / experiments on and off via GS command.

A new inter-board bus and stacking connectors will be needed

ASCENT projects now in development will be flown

AMSAT also has University scientists on staff that would like a means of doing experiments with satellites in LEO